1171.h.21.
3

A CURIOUS RESEARCH INTO THE *Element of WATER*;

CONTAINING

Many Noble and Uſeful EXPERIMENTS on that FLUID BODY.

AS

I. Three different Experiments of reducing WATER into EARTH.

II. Several Experiments of turning SALTS into WATER; with a Method of diſcovering their intrinſic Earths, and of what Nature they are.

III. A Method of turning VITRIOL of MERCURY into WATER; with a way to extract the genuine Earth of that corroſive Body.

IV. An Experiment proving that that there is a latent FIRE in WATER; with a Method to attract the ſaid FIRE from the WATER, and to render it viſible, *&c. &c.*

The whole Interſperſed with Curious QUERIES *and* REMARKS.

Being the Conjunctive Trials of *AMBROSE* and *JOHN GODFREY*, *Chymiſts*, from their late Father's OBSERVATIONS.

LONDON:
Printed by T. GARDNER, and Sold at his Printing-Office, at *Cowley's-Head*, oppoſite St. *Clement's-Church* in the *Strand*. 1747.
(Price One Shilling.)

29

B L

A CURIOUS
RESEARCH
INTO THE
Element of WATER,

CONTAINING

Many noble and uſeful EXPERIMENTS on that fluid Body.

AS earth is, of all the elements, the moſt ſolid, on account of its conſiſtency, hardneſs, dryneſs, &c. in bodies; ſo likewiſe water is allowed to be the moſt fluid and conſtitutive body, on account of its eaſy mixture with other bodies, and particularly its incombuſtibility: for in its nature it never is inflammable, as ſalts never will burn of themſelves; but there is a proper vehicle, and a certain inſtrument prepared by chymiſtry, which is, as it were, the univerſal menſtruum.

For the chief maſters in the art of chymiſtry generally allow, that ſalts do not diſſolve other bodies, unleſs firſt the ſalts be diſſolved; but in fluids and liquid ſalts, in oils, in ſpirits of all kinds, that water, on account of its fluidity, is alone exiſtent. And we will venture to ſay, that if in nature there were ſuch a liquid, which is called the Alcaheſt of *Helmont*, we might juſtly conclude water its firſt conſtituent, becauſe it would be liquid; and it ought to be of ſuch a nature, that the moſt ſubtile and diſſolving particles, the main conſtitutive parts of all kind of hard matters in nature, might be eaſily perceived.

For which reaſons I ſhould think that the ſaid liquor was impregnated with ſalts, or elſe it could never have diſcharged the earths of the ſubtile phlogiſton, of which they partake, or have ſeparated the ſtrict union of the oils. We have one reaſon more to add for its being aquous, becauſe all bodies intrinſically abound with proper ſalts, which muſt be diſſolved and diluted: but of this, more in another place.

We have not hitherto been ſufficiently convinced, whether the water or earth were priorly conſiſtent: reaſons have been given however, by which it ſeems moſt probable to think, that the earth was the mother of the waters; but how juſtly they are founded, in the ſequel will more plainly appear.

Therefore, laying aſide theſe diſputes, we ſhall enquire into the nature of the element of water, and ſee what we can explore by experiments, of its nature and origin.

We took water, thoroughly diſtilled, clear and ſeparated from all heterogeneous particles as much as poſſible, and poured a ſmall quantity into a glaſs mortar; we ground the ſaid water without intermiſſion, with a machine prepared for that purpoſe, in the nature of a ſpit, turned round by clockwork, which raiſed the peſtle, day and night inceſſantly, till its funiculus began to turn; then the water lathered, as if ſoap had been diſſolved in it; and in four days time, it acquired a thickneſs and ſolidity; and at laſt was reduced into earth, or earthy ſmall duſt, of a white colour, and inclinable to a grey.

You muſt take notice at the firſt, not to pour too much water into the mortar, but to pour it in by degrees, the ſooner to obtain the ſiccity; then by degrees pour in more, for it is a tedious and laborious experiment, requiring a deal of patience; it being ſufficient to find a manifeſt proof, that the thing may be obtained, according to approved rules of natural philoſophy.

If you conſtantly ſupply freſh water, diſtilled as aforeſaid, the operations, for procuring the ſiccity, will be ſooner finiſhed, as ſoon, namely, as the terrification begins: but you muſt exactly weigh the firſt and the laſt water; and then you will find that ſix and thirty ounces of water will, after the operation thus made, weigh but one ounce, the other remaining ounces, by the continual motion, being diſſipated into air.

This ſort of earth is fixed in fire, and will not eaſily liquify, but will certainly turn to a ſolid red earth, like vermilion, if it be done in a retort, or very ſtrong crucible without bellows.

We deſire this experiment, now mentioned, may not be laid too great a ſtreſs upon; becauſe ſome people may think it but imaginary, on account of the terrification, and that there is but little in it, when done in the open air, conſidering the motion of the air, and that the ſubtile earthy particles again ſubſide, upon the ſuperficies of the water: for the water, while humid, is of that nature, that a very thin duſt will always ſtick to it, as being conſtantly floating in the air, which ſaid particles may be thought to belong to the water, though thus floating in the air; nay, may be even eſteemed as parts coefficient of the water. We willingly agree, though ourſelves and others be not fully convinced of the real fact, that this may ſeem probable: we likewiſe agree that, by the perpetual motion or uſe of the machine, ſomewhat may be conſumed of the ſaid machine; but we rather ſubmit to allow, that ſtill there is more of the water than earth, which we believe is the ſafeſt; and therefore propoſe an experiment, which will obviate all objections, and ſatisfy the curious.

Take fine clear water, which has been diſtilled, abſtract it frequently, by diſtilling it in a glaſs retort, as often as poſſible, and it will always leave ſomewhat of earth, or at leaſt an earthy ſoam, which ſome ſort of waters will produce ſooner than others; as we have tried by ſeveral experiments: but by the means propoſed, you will get a greater quantity of earth from the water. It is from hence, that *Helmontius*, and many more, began to have our thoughts, now mentioned: you may likewiſe conclude from hence, that ſeveral, who have tried this experiment, have produced a larger quantity of earth from water; but yet it cannot certainly be defined, what quantity: for if the joints in the veſſels are not thoroughly cloſed, ſo that no water be waſted by evaporation and ſpilling, ſeeing it requires a year's time and more to come to the thorough experiment, it being abſolutely neceſſary that the experiment be without intermiſſion; for elſe it may turn the whole maſs of water into a white ſort of earth, which will abſolutely reſiſt the power of fire to the utmoſt degree.

Much more may be obſerved by the following experiment, in what relates to the terrification or change of water into earth: we took an ounce of clear diſtilled water, and having prepared a longiſh phial, very ſtrong and thick, of double flint, which phial was beſides ſo large as to hold four or five ounces more than what we put in; we ſealed it hermetically, as our alchymiſts are pleaſed to call it, and placed it in a furnace duly prepared, ſo that it wanted no ſupply of coals, except every twelve hours, by reaſon of the ſpare and moderate acceſſion of the air; thus we kept a very moderate heat to it for a month or two, and the water began to move gently in a circular motion; for the vapours that aroſe, always returned in drops: but ſome months being elapſed,

lapſed, as the water in the mortar after three days, ſo here it began to thicken, and ſeemed diſturbed; and having ſtood above ten months, there were ſeen, upon the ſuperficies, ſome earthy particles, which particles, being broken by the ſtrong motion of the water, ſunk to the bottom by their own gravity.

In ſhort, when this digeſtion had laſted fifteen months, the water was entirely coagulated, without any evaporation at all. But note, it is abſolutely neceſſary, in the beginning of the operation, to keep an equal heat; and if, after a month or two, you add to the heat, let it be done very moderately, and by degrees, ſo as hardly to be perceived. At length the bottom of the phial gained a thickneſs, for day by day the water grew thicker, and preſently ſeemed to be capable of bearing a greater heat; and, the operation being finiſhed, we found white earth like chalk, or not unlike magiſtery, vaſtly fine and perfectly dry.

Thus all water may be reduced to earth, which alone is fixed; it is likewiſe calcinable, nay, may be reduced to glaſs, by a very ſtrong heat: for if ſuch earth be caſt, it produceth glaſs. Hence we ſaw that all the weight of the water, without evaporation or diminution, was turned into earth firſt, and afterwards into glaſs: and thus, according to the old proverb, *labor improbus omnia vincit.* Neither do I think it ſo great a paradox to ſay, that of a pound of water you may produce a full pound of glaſs, or that water may be reduced to a fixed body, and that body diaphonous too, without evaporation or any diminution of weight.

This experiment, we own, is of little uſe, but yet we think its conſequence is very great; for it proves to a demonſtration the origin of earth, and the priority of water, and the prodigious effects of heat: for which reaſon we are no ways ſurprized that ſo many chymical philoſophers have declared water to be the firſt principle of bodies, and the matter from whence all are produced; as likewiſe, that they ſhould ſay moſt, if not all bodies, may eaſily be reduced to water.

The great and famous *Engliſh* philoſopher, *Francis Bacon*, of *Verulam*, is of our opinion, as may be ſeen in his works; where he ſaith, 'Let us enquire into the force and power 'of heat, what things may be produced from the hidden 'parts of bodies, and whether theſe alterations proceed from 'without or from within?' To which, we think, we may add, that the power of fire or heat, in ſome bodies, may eaſily be proved to be twofold, nay even threefold; for that great man ſeems to have had a regard, not only to growing, living, and mixt bodies, but likewiſe to the general bodies of the terraqueous globe. But by heat and its power, he ſeems to intimate the univerſal active fire and heat, inherent to all concrete bodies.

After theſe experiments, our notions of fire, and its properties, ſtuck the cloſer to us, eſpecially having read what ſome great men have declared upon this head; for they make mention of its exiſtence in all bodies, and its powerful efficacy; which, though it hitherto hath not been ſufficiently deſcribed, yet fire exerts itſelf not only internally in bodies, but inviſibly in the atmoſphere, where it enters, ſurrounds and nouriſhes bodies; and laſtly, viſible fire or flame ſhews its efficacy, as chymiſts know, and may eaſily be proved in this experiment: for innate fire will always ſtir up water; will render it more fixed; it drys it, and, at laſt, turns it to earth and glaſs; and by the juſt-mentioned experiment we were convinced of all this.

The great experiment of the illuſtrious *Boyle*, is well worth obſerving; for he, by a moſt laborious diſtillation, in length of time obtained ſix drachms of earth out of one ſingle ounce of water, though there be ſome who ſcruple it, nay even think it an impoſſibility. But we are fully perſwaded, that the remaining two drachms of water, by a two hundreth diſtillation or more, might have been reduced to an earth of the ſame nature with the other.

Having undertaken to treat of the ſeveral experiments made by water, we ſhall likewiſe try to prove a latent fire in water: and firſt, how the ſaid fire may be extracted from the water, and be rendered viſible from air.

It is ſufficiently known, that ſalts, if not too much impregnated with acids, or containing too much of groſs earth, do attract ſomewhat from air: both ourſelves and ſome friends, have frequently thought ſomething to be in it, and admired the juſt mentioned effect; and one of our ſaid friends, ſome time ſince, told us, that the experiment was contemplative and witty, and that a large quantity of water might be extracted from the air by attractive ſalts; which he knew by a tireſome chymical experiment. Having, therefore, inſiſted upon theſe conjectures and trials, we thought fit, in this place, to urge the ſeveral experiments we have made in relation to the mutation of ſalts into water.

A fixed alcaline ſalt, if duly prepared, will readily diſſolve, and grow faint and languid, if it be expoſed to the air or cold, in a plain glaſs diſh or baſon, and you will ſoon perceive it to increaſe in weight: nay, as ſalts are divers, ſo likewiſe the weight is different of the attracted matters; for one ſort of ſalt attracts more and ſooner than another, according as it is duly prepared or burnt; but an alcaline ſalt, for certain, increaſeth above half, nay even twice or thrice it's weight, if time enough be allowed; and I am very ſenſible, if a man were to continue the operation for a whole year, that all the ſaltneſs might be changed into a clear liquid. For if a deliquium be made, as much as poſſible,

ſible, and the liquor diſtilled, it affords a water without any taſte, and very like to common water, the ſalt ſettling at the bottom; and then it may quickly be prepared ſo as to attract again.

We have obſerved, that moſt, if not all, of theſe magnetic ſalts, have entirely loſt their ſubſtances; for as this reſolution has been made, by degrees, in cold air, ſo the fixed ſalts always, by degrees, have loſt ſome ounces. And by making the foregoing Experiment we found, that one pound of ſalt produced, this way, ten pounds of water, but that the ſalt was entirely loſt, and not even one drachm left.

And it is ſurprizing to find, after this reſolution is finiſhed, that not the leaſt ſaltneſs is to be found, nor even any taſte of it, whereas at firſt it was a fixed ſalt: Nay, as the ſalt begins to ſeparate (for you muſt know, that ſome ſalts abound with earth, ſome more, ſome leſs, and that more or leſs of intrinſic earth will ſubſide in the baſon or platter, like magiſtery or magneſian nitre) it needs no more water to be added to it, when the ſaid earth ſometimes is edulcorated by air.

If a perſon has a mind to apply himſelf to theſe experiments, he ought to chuſe the cleareſt ſalts, which have as little earth in them as poſſible; for, in theſe trials, ſuch ſalts will require a longer time.

The author of *Boerhaave*'s chymiſtry ſaith, he made the experiment with common or ſea-ſalt, and produced a great deal of water, and a ſmall quantity of earth; but he doth not mention how much of either, or what ſort of earth it was. All ſalts do not leave a white earth; for acid volatiles, being more weighty, leave one ſort, the entire ſalts another, and the alcalines another ſort of earth.

We once put live Mercury into a crucible, which being wetted with three parts of oil of vitriol, and ſurrounded with live Coals, coagulated like ſalt; which ſalt, or rather vitriol of mercury, if expoſed to the air in a cold cave, would likewiſe diſſolve, and give a large quantity of water; but the mercury will revive, and be ſeen alive at the bottom of the crucible, when the operation is finiſhed.

We no ways doubt, but ſuch a reſolution of this acid ſalt would ſucceed full as well, if ſet open in a cave; but whether it would happen ſooner without mercury, we cannot reſolve. But we think it a curious piece of work, and that by this method, the genuine earth of this corroſive may be extracted, and ſome new phænomena found out, on account of it's intrinſick phlogiſton: enough of this; we ſhall leave the further diſquiſition to the curious. For there are a great many of ſuch attractive ſalts, ſome more pure, others more compound, whoſe earths will likewiſe be found to be divers, though their waters, attracted from the air, are of one and the ſame efficacy, as we are fully convinced. Particularly ſomething very curious will occur, if the oil of vitriol be totally diſſolved. For there is the ſoot of ſulphur, and the fat particles are ſtill contained in them, together with it's fundamental acid ſalt.

We return now to the water of air, and poſitively affirm to have found it to be true common water, as to it's taſte, it's effects, and all other characteriſtics. For it evaporates, when boiled, in the ſame ſpace of time, and with the ſame degree of heat as common water; as may eaſily be proved by a thermometer; and the ſaid water is as ſoon diſtilled, if firſt it be extracted from the body of it's ſalt: it is turned to earth by motion and trituration; it's whole maſs will coagulate in a cloſe veſſel, juſt as common water; it will freeze in a hard cold, and hath all other criterions, *viz.* it hath the power of diſſolving ſalts, juſt as common water.

As to reſolution of ſalts, moſt think that ſalts only attract out of the air nothing but common water, now perfect and again ſubtilized and expanded in the air: but then ariſes this query, whether it's taſte is gone? how it is done or happens, that, in particular, a whole pound of fixed ſalt is conſumed, and made volatile? what is it, that ſo accurately hath ſeparated the earth? and a great many more ſuch like queſtions.

If, on the contrary, we proceed, not in the air, but in the bath of dew, we again find it true, that if ſuch fixed ſalt be ſuſpended over the bath of the ſea, in it's diſh, in order to be reſolved, a liquidation will ſucceed; but you muſt make uſe of a covered or cloſe bath, made ſo, that the watery vapours cannot too ſoon get out or evaporate; and the vapours of the air, which fundamentally procure the reſolution, do not enter too thick; and then you may obſerve, that they differ from the watery ſolids. Thus it is diſtilled in a different manner, than in the air or in a cold place; this fixed matter is not diminiſhed to ſome ounces, as it happens in the reſolution by air or cold; but each pound rather increaſes by one ounce and half, nay ſometimes by two ounces.

We leave it to others to judge, whether it be perceivable or no, that the reſolution in air is quite different, from that made by watery vapours. As for our parts, we cannot think that the vapours of the water alone are ſufficient for the conſumption of the body of ſalt and it's taſte.

Moſt people know, that water will make ſalt liquors and diſtilled acids volatile, if they both be boiled to exceſs; but whatever is taken from the water by theſe, is again eaſily diſcovered, by putting into it ſome thin plates of certain metals; nay, is by them again collected, attracted, ſeparated, and recovered: but here is an abſolute and total reſolution of the fixed ſalt, into an inſipid ſubſtance, which, however, is indeed conſiderable and curious: and, we are apt to think, owing to the aerial fire: ſeeing nothing touches the fixed ſalts, and renders them inſipid, and at the ſame time violatile, but the matter of inflammable fire.

One thing may here be objected, if any knew how to prove, to a demonſtration, which way all fixed ſalts evaporate, when expoſed to the air in cold, but firſt produce ſuch an effect, that, before they evaporate, or depart in air, they precipitate water; but whereas this demonſtration ſeems to us impoſſible, we may juſtly defend the thing itſelf, according to the opinion of the great Sir *Iſaac Newton*, who, in his *Opticks*, p. 319, treating of the various mutations of water, ſays, *Water is a very fluid ſalt, volatile, and without taſte.*

Some people think Sir *Iſaac Newton* went too far in this definition, becauſe he calls water an inſipid ſalt; but when it congeals to ice by froſt, as ſalts by froſt cryſtalliſe and keep their taſte, then it is agreeable to truth, to ſay, that water is the moſt ſoft ſalt, or at leaſt a fluid heat; eſpecially if you conſider it's origin, and weigh exactly what has been ſaid upon this head.

One thing more is not to be paſſed over in ſilence, in this our ſhort treatiſe of the reſolution of ſalts by air. The moſt ingenious Sir *Iſaac Newton* tells us it may be done, and that the efficacious powers and faculties of bodies depend upon the parts of light, which help to compoſe them; where, without doubt, he underſtood the light or fire inherent in water: and in the ſame place, as he mentions other bodies, ſo likewiſe of water he makes mention, that it may often be changed, by an often repeated diſtillation into earth, according to Mr. *Boyle*'s experiment; which earth will be fixed, and capable to bear fire. And afterwards he ſays further, that this earth, like other bodies, will keep light longer, and emit it, when heated in fire. But, in that gentleman's opinion, no *body* is thought leſs fit, than raw water, becauſe it reflects, whilſt it emits light, when turned to earth; neither will this change ſucceed, unleſs actuated by fire; and that water is not deficient of it's light or fire, is very conſiſtent with reaſon, and that to light and fire the whole power of penetration and change muſt be attributed.

That great man, in the place juſt mentioned, has demonſtrated the other changes of water; that it is turned into vapour, a kind of air, by heat; into ice, by cold; and that vapour is a kind of air; and ice, a ſort of hard ſtone, eaſily reſolvable by heat.

By what has been ſaid of the changes of water, any one may eaſily comprehend, that other actions are hinted at; namely, the actions of circumambient light or fire; for water, if the circumambient fire of the air ceaſeth, or is removed, turns to ice; and if the ſaid fire is added, it diſſolves. But you muſt not think, that the particles of light or heat, which help to compound water, are removed with the external body; for the fire, which exiſteth by the atmoſphere, is rather diffuſed, and is not ſufficient to preſerve the water that is to be liquified. They, therefore, who think that all bodies harden and ſeem frozen, and that without any motion at all, if the fire be diminiſhed or removed, only ſpeak of the circumambient fire, which is contained in the air or atmoſphere, but not of the particles of light, which are innate, as I may ſay, and inherent intrinſically to the ſaid bodies. For theſe particles being removed, there certainly is no matter exiſting; in our opinion, nothing to be changed: for all change is made by action, and ſucceeds thereby; and is certainly owing to the intrinſic fire or light.

This experiment, by which water is extracted from air, proves that the root and baſis of all water is ſalt, which is reſolvable in air by this method.

Hence we ſee that ſalt is ſeparable from almoſt all fiery matter, though the moſt ſubtile; that the moſt ſavoury does not join with the fiery only, but even ſtick to it: and by various experiments we are convinced, that the phlogiſtic ſalts are covetous and very greedy, and that there is a near relation between theſe two; of which more hereafter.

If any perſon could be found, that knew how to produce fire or ſome phlogiſton, without any ſalt, or the pureſt ſalt, without any tincture of the phlogiſton, we ſhould think him the greateſt artiſt in the world. We likewiſe ſhould think, if any one knew how to deſtroy the reciprocal harmony, there is, between the two ſalts and the phlogiſton, that the ſame perſon would be capable of giving law to nature, and at any time to break and overturn it.

Hence it is worth while to obſerve, that theſe ſorts of ſalts, when expoſed to the air in order to be diſſolved, when ſo liquified, will not freeze in the coldeſt ſeaſon; whereas ſweet waters, on the contrary, quickly freeze, and turn to ice: for which, certainly, no other reaſon can be given, than that ſuch lixivium, being ſtill ſharp enough, is ſalt and ſavoury. But who can prove exactly the contrary, that, namely, there is not hid ſome fiery power in this tart taſte?

If theſe waters, by diſtillation, are deprived of their ſavour, they, like common water, will immediately turn to ice.

The livelier and ſtronger the ſalt, and the more ſharp and rigid the cold, the ſooner the reſolution of ſalts ſucceeds, and the leſs it's freezing is to be feared: there is therefore in ſalts, at ſuch times as they have their reliſh, and are reſolved, a latent power of fire, before the whole weight of the ſavoury body languiſhes, or is totally turned to inſipid water: the power of fire ſeems leſs in inſipid ſalt, namely, in perfect water, as may be ſeen plainly in their changing to ice.

emit it, when heated in fire. But, in that gentleman's opinion, no *body* is thought leſs fit, than raw water, becauſe it reflects, whilſt it emits light, when turned to earth; neither will this change ſucceed, unleſs actuated by fire; and that water is not deficient of it's light or fire, is very conſiſtent with reaſon, and that to light and fire the whole power of penetration and change muſt be attributed.

That great man, in the place juſt mentioned, has demonſtrated the other changes of water; that it is turned into vapour, a kind of air, by heat; into ice, by cold; and that vapour is a kind of air; and ice, a ſort of hard ſtone, eaſily reſolvable by heat.

By what has been ſaid of the changes of water, any one may eaſily comprehend, that other actions are hinted at; namely, the actions of circumambient light or fire; for water, if the circumambient fire of the air ceaſeth, or is removed, turns to ice; and if the ſaid fire is added, it diſſolves. But you muſt not think, that the particles of light or heat, which help to compound water, are removed with the external body; for the fire, which exiſteth by the atmoſphere, is rather diffuſed, and is not ſufficient to preſerve the water that is to be liquified. They, therefore, who think that all bodies harden and ſeem frozen, and that without any motion at all, if the fire be diminiſhed or removed, only ſpeak of the circumambient fire, which is contained in the air or atmoſphere, but not of the particles of light, which are innate, as I may ſay, and inherent intrinſically to the ſaid bodies. For theſe particles being removed, there certainly is no matter exiſting; in our opinion, nothing to be changed: for all change is made by action, and ſucceeds thereby; and is certainly owing to the intrinſic fire or light.

This experiment, by which water is extracted from air, proves that the root and baſis of all water is ſalt, which is reſolvable in air by this method.

Hence we ſee that ſalt is ſeparable from almoſt all fiery matter, though the moſt ſubtile; that the moſt ſavoury does not join with the fiery only, but even ſtick to it: and by various experiments we are convinced, that the phlogiſtic ſalts are covetous and very greedy, and that there is a near relation between theſe two; of which more hereafter.

If any perſon could be found, that knew how to produce fire or ſome phlogiſton, without any ſalt, or the pureſt ſalt, without any tincture of the phlogiſton, we ſhould think him the greateſt artiſt in the world. We likewiſe ſhould think, if any one knew how to deſtroy the reciprocal harmony, there is, between the two ſalts and the phlogiſton, that the ſame perſon would be capable of giving law to nature, and at any time to break and overturn it.

Hence it is worth while to obſerve, that theſe ſorts of ſalts, when expoſed to the air in order to be diſſolved, when ſo liquified, will not freeze in the coldeſt ſeaſon; whereas ſweet waters, on the contrary, quickly freeze, and turn to ice: for which, certainly, no other reaſon can be given, than that ſuch lixivium, being ſtill ſharp enough, is ſalt and ſavoury. But who can prove exactly the contrary, that, namely, there is not hid ſome fiery power in this tart taſte?

If theſe waters, by diſtillation, are deprived of their ſavour, they, like common water, will immediately turn to ice.

The livelier and ſtronger the ſalt, and the more ſharp and rigid the cold, the ſooner the reſolution of ſalts ſucceeds, and the leſs it's freezing is to be feared: there is therefore in ſalts, at ſuch times as they have their reliſh, and are reſolved, a latent power of fire, before the whole weight of the ſavoury body languiſhes, or is totally turned to inſipid water: the power of fire ſeems leſs in inſipid ſalt, namely, in perfect water, as may be ſeen plainly in their changing to ice.

We might ſuſpect, that the fire, latent in the ſolid maſs, were the cauſe, that the maſs continued liquid in the greateſt froſt; but, if latent in the liquid maſs it produces this effect, how is it that the ſame maſs by fire is hardened? which is viſible in the reſolution of ſalt in the air, and in the reſolution of oil by fire or phlogoſis. For the firſt is turned to water by cold, and the ſecond by fire, into a ſooty earth; and it is remarkable, that, as the proper and reliſhing body of ſalts attracts the ſubtile vapour of the air, and by degrees mixes itſelf with it, ſo likewiſe gradually and ſucceſſively, or more and more the intrinſic earth of the ſalts ſettles at the bottom of the veſſel. The more inſipid the ſalt grows, the more it loſes it's ſolving power, which before it exhibited towards the earth: nay, when at length it is made a ſalt, it is a true inſipid menſtruum, no more ſolveth earths, neither it's own earth, which it has laid off, nor any other, which before it was capable of, but only dilutes other ſalts extremely well: thus inſipid ſalt or water is the menſtruum of ſalts, by a natural ſimilitude.

The uſe of what we have aſſerted ſeems to me to be very great: for firſt, by this operation, we plainly ſee, that the chief ſolving faculty of ſalts conſiſts in it's reliſh; next we perceive likewiſe, that much is collected from the ſubſtance of the water, it's conſent and correlation to the vapoury air and ſapid ſalts: nay, by theſe operations the intrinſic earths of the ſalts, of what nature, and how many, are diſcovered.

Whereas all fixed, liquid and diſtilled, or volatile ſalts have their earths, it is hence the more evident, why the ſaline ſpirits moſt firmly join themſelves always to freſh waters, and why waters readily diſſolve ſalts, and all other reliſhable things.

But that fire or a fiery eſſence, is inherent in the center of the ſalts, which we reſolved, and is ſtill remaining, though the ſalt be diſſolved to water, and after it's concretion with air, and is likewiſe incorporated in the water itſelf, will, in ſome wiſe, appear by the following experiment.

We took water, attracted from air with alcaly or fixed ſalt; we diſtilled it, that it might be more pure and taſteleſs; we put it into a phial, and boiled it, juſt as if we had deſigned to make the above-mentioned experiment of terrification: when it was thus digeſted, without exploſion, for three months, the water grew turbid, and thickened, engendered earth, and was upon the point of turning into it: we removed the fire, and ſet the phial aſide, in order to cool; the ſecond day we opened it, being thoroughly cold, and, through a funnel, poured in a like quantity of raw water, not boiled, to it into the phial; and the raw water was equally cold, with what was in the phial; but the phial being moved, grew warm, and there aroſe a mild ferment, the water looked reddiſh, and gave a ſoapy and pleaſant ſmell; it had likewiſe a mild, as it were, fat and balſamic taſte; the portion of earth ſubſided to the bottom of the phial, in a ſmall and whitiſh quantity.

From theſe phenomena, we may judge, whether there were not in the water a latent fiery power; witneſs it's heat and reaction with raw unboiled water. For this fire is weak in raw water, but by extrinſic motion it's fire is excited by degrees, and at length obtains a perfect hardneſs, and is included in the body of the earth; it prepares the ſaid body, and changes it by it's own action, and is inherent in, being cloſely mixed to, each the minuteſt atom of the ſaid earth.

For curioſity's ſake, we will add various other experiments of one of our friends, who had good ſucceſs this way, with water drawn from air. For they will explain, in ſome wiſe, the nature of the air included in theſe waters, and the curious effects of ſome operations, as they may give hints for further indagations.

Sometimes the water drawn from air will, in a manner, inform you of the condition or quality of the air, at the time the water was extracted: for example; once a certain phial, containing water, which had been boiled for three months, was opened, and raw water being poured to it, a heat and effervency aroſe, and it produced a quick and ſenſible ſweet and balſamick ſmell of flowers; which ſmell was certainly extracted from the air, at the time when it was ſenſibly odoriferous; namely, it muſt have been expoſed to the air in the ſpring, when the earth is flouriſhing. Neither is it amiſs to attribute the fragrant ſmell to the moſt ſubtile effluviums of the flowers, impregnated with igneoleous and ſaline-volatile particles, as the author of the *Boerhavian* chymiſtry reports: who ſeems to have made many trials, relating to theſe oils and their ſmell; how, namely, the ſmell and ſweetneſs of oils, prepared from flowers, evaporates into air and vaniſhes, if they be expoſed in diſhes to the open air: and how it might be proved, which way the aerial ſubtile, by motion and preſſure, might be extracted and diſſipated, ſo that nothing might remain beſides a common unſavoury fatneſs, and the whole maſs be void of all taſte.

Another friend undertook this experiment, and performed it in roſe time, at the back part of his houſe, near a roſe-buſh; and it happened, after the diſtillation and boiling, being opened, it ſent forth a pleaſant and ſenſible roſy ſmell.

A worthy man formerly undertook and finiſhed a tedious and laborious experiment with aerial water, namely by trituration; he took one drachm of leaf gold, and put it into a glaſs mortar, and conſtantly poured a certain weight of aerial water to it, then dried it only by motion; he mixed ſix and thirty drachms of water with the ſingle drachm of gold: at length there were but two drachms of dry duſt left; as we have already explained it in the beginning of theſe ſheets, ſo here it happened; for the aerial effluvias evaporated again, and the particles, which, before the reſolution, were ſaltiſh and ſavoury, departed at the ſame time.

For if one part of ſalt, at the moſt, attracteth from the atmoſphere nine times it's weight of ſubtile aerial matter according to the computation by the experiment; but by a perpetual motion ſix and thirty parts of ſuch water leave only one part of fixed earth; though conſidering the intrinſic ſalt, they contain three and thirty parts; for the tenth part of the weight, in the reſolution, is owing to the ſalt, that's loſt; and therefore we muſt believe, that nothing is left in the mortar, by this operation, but a ſmall quantity of the intrinſic earth of the ſalt; unleſs it be ſome atoms of the earthy matter wavering in the air, and ſo by degrees ſinking into the mortar, and certainly nothing can be left of the water.

Perhaps it might be, that the ſubtile fluid attracted, might be wholly diſſipated into air, together with the ſalt, thus made volatile. The aforeſaid gentleman affirms, and brings arguments to prove, that the matter of gold and the aerial water, in the trituration, diſperſed a pleaſant aromatic ſmell; but that both, after the exſication made, not by fire, but by motion, in the cold air, were turned into duſt, a little inclinable to a white grey; it might have been moſt fixed in fire and reddiſh after a ſtrong calcination: and he avers, that afterwards not the leaſt atom of gold was viſibly to be found in it.

As to what relates to the aromatic ſmell, we may obſerve, that, whereas it was leaf gold, or what was hammered very thin, that ſmell might depend upon the ſmall ſkins the gold-beaters uſe, which are like book-leaves, between which the gold-beaters place thin plates of gold, and ſo beat them with a hammer.

For theſe leaves or thin ſkins are prepared with maſtix and other balſamic oils, which, the more they reſiſt the blows of the hammer, the more tenacious they are, ſo that you cannot diſſolve or break them.

He likewiſe avows, that neither the goldſmith or himſelf could reduce the ſaid powder into gold, though they made uſe of lead, antimony, and all other reducing means; ſo that, by this means, the gold was made irreduceable?

Further he propoſed many queſtions to us, relating to the point of deſtruction, and the impoſſible reduction: whether, namely, gold might be deſtroyed by trituration and diſcontinuation, or by the intertextures of ſubtile earth, or whether it were from the air, the ſun, or from the water itſelf. For it might happen that ſuch earth might be ſtrongly and intimately inſerted, by which, gold in weight, might increaſe to earth of gold.

He queſtioned whether this diſſolution might not ariſe from the motion and addition of earth in the maſs of gold; if from the former, the foreign mixture, or if the mixture of this firm and tenacious body by this way were altered; or whether the indolent ſalt, latent in the mixture of the ſalt itſelf, had any power to diſſolve gold?

Or whether it had gotten any thing balſamic out of the water of the air (here he forgot the balſamics contained in the little skins) with the moſt dry phlogiſton of gold? or whether it had ſuffered any change in that part of the gold, that was conſentaneous with the oil? or whether it had undergone any hidden fermentation, ſeeing the gold and water always ſoam? or whether the action of the air, by this means, had contributed any thing to the deſtruction of the metal? or whether all theſe, put together, might be the cauſe of deſtruction? and many more queſtions of this kind.

It ſeems to us that this gentleman was ſo very ſolicitous in this operation, becauſe he thought, and was perſwaded ſome great medicine might be prepared ſrom this powder. But theſe queries we ſhall leave to the determination of the curious, and not at preſent enquire, whether the reduction of the ſaid powder be poſſible or not, neither will we try it. For ſometimes theſe operations deceive us, as the phenomenon of ſmell deceived our correſpondent, ſeeing it depended upon the gold-beater's skins.

FIN

MVSEVM
BRITAN
NICVM

16